DAVONG
Systems, Inc.

DSI-A16
REFERENCE GUIDE

DSI-A16 OPERATING INSTRUCTIONS

MEMORY MAP

The DSI-A16 card is a 16K byte device. However, this 16K is mapped into a 12K address space (see fig. A). This is achieved by dividing the address space into two banks of 4K and one bank of 8K. In addition, this 16K area is shared with the APPLE ROM array.

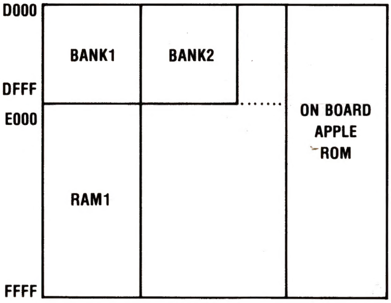

fig. A

The RAM may be selected for read only or for read and write. Also the DSI-A16 may be entirely disabled so that the ROM may be accessed, or it can be partially enabled so that the RAM may be written and the ROM read.

To configure the DSI-A16 card, there are eight control addresses that the user reads from. This reading action, in addition to causing a configuration change, causes a status nibble to be returned in the low 4 bits.

CONTROL ADDRESSES

$C080	Reading this address disables the ROM and enables BANK2 and RAM1 for read only. (The RAM is write protected.)
$C081	Reading this address twice consecutively enables ROM and write enables BANK2 and RAM1.
$C082	Reading this address enables ROM and write protects RAM.
$C083	Reading this address twice consecutively enables BANK2 and RAM1 for both read and write.
$C088	Reading this address disables the ROM and enables BANK1 and RAM1 for read only.
$C089	Reading this address twice consecutively write enables BANK1 and RAM1 and enables the ROM for read access.
$C08A	Reading this address enables the ROM and write protects the RAM.
$C08B	Reading this address twice consecutively enables BANK1 and RAM1 for read and write.

The write enable functions require two consecutive accesses to actually write enable the RAM. This is a first level of protection to insure that an accidental write enable does not cause any data loss. However, if the board is not in a write protect state then any action causing another write enabled state will actually write enable the board. That is, when the board is in a write protected state two consecutive reads are required to write enable the RAM. Otherwise only one write enable command will write enable the RAM.

▶ THE ADDRESS LINES

The control functions are established via address lines A0, A1, and A3 as follows: A0 and A1 control the function and A3 controls bank select.

A1	A0	FUNCTION
0	0	RAM read only.
0	1	ROM read. Two consecutive reads write enables RAM.
1	0	ROM read. Write protect RAM.
1	1	RAM read. Two consecutive reads write enables RAM.

A3=1	Selects BANK1 and RAM1
A3=0	Selects BANK2 and RAM1

▶ STATUS BITS

BIT 0	When BIT 0=1 then BANK1 is selected. When BIT 0=0 then BANK2 is selected (This is the power up state).
BIT 1	When BIT 1=1 the RAM is read enabled. When BIT 1=0 the ROM is enabled (This is the power up state).
BIT 2	When BIT 2=1 the RAM is write enabled. When BIT 2=0 the RAM is write protected.
BIT 3	When BIT 3=1 one access to write enable the RAM has been made. When BIT 3=0 the second access to write enable the RAM has been made.

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DSI-A16 REFERENCE GUIDE

FEATURES

- 16K byte memory expansion card for the Apple™ Computer.
- Completely compatible with Apple Computer software and hardware.
- Runs at the same speed as Apple memory products.

DSI-A16 INSTALLATION INSTRUCTIONS

TURN THE POWER OFF

Since you will need to go inside your APPLE it is important for your safety and the integrity of the devices inside the APPLE that the power be off when removing or installing any component.

REMOVE THE COVER FROM YOUR APPLE

The cover of the APPLE is fastened with plastic snaps at the back edge and is slid under the front edge. To remove the cover pull up firmly on the rear edge. When the snaps release be careful that the edge you're holding does not rise more than about one inch.

Slide the cover toward the rear of your APPLE to expose the interior.

REMOVING A CHIP

Installation of DSI-A16 requires that one of the chips in the APPLE be removed. To locate the chip look inside your APPLE and locate a large white or gold square on the circuit board. This square is about 4''x4'' and surrounds an area 8 chips by 3 chips. See figure 1.

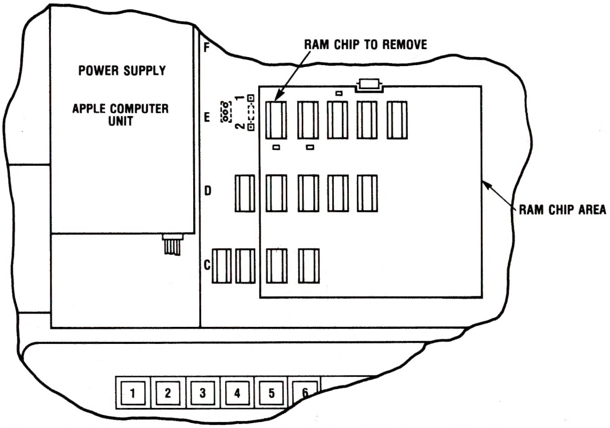

fig. 1

IMPORTANT

Touch the power supply cover (the gold box inside the APPLE and to the left) before touching any components. This discharges any static electricity you may be carrying. A high static charge (you could carry up to 20,000 volts) can damage electronic devices.

▶ SLOT 0 MUST BE EMPTY

If there is already a card in slot 0 then remove it.

▶ LOCATE THE CHIP TO REMOVE

In the upper left corner of the big white square is the RAM chip you will need to remove.

▶ TO REMOVE THE RAM CHIP

You will need a small flat blade screwdriver or a small pen knife to pry up the RAM chip. The RAM chip is in a socket which is about 3mm thick. Insert the screwdriver between the socket and the RAM chip. Pry the chip up about 1-2mm and no further. Remove the screwdriver and insert it in the other side. Again pry this side of the RAM up about 1-2mm. Repeat this procedure raising each side 1-2mm with each iteration until the RAM chip has been removed. Be careful during this step. It is easy to bend the pins on a chip during removal. Also, it's a good idea to touch the power supply box to discharge any static you may be carrying.

▶ ATTACHING THE CABLE CONNECTOR

The plug at the end of the ribbon cable will go into the empty RAM chip socket. The edge strip (the part that sticks out from the board) will go into slot 0. Position the card with the edge strip over slot 0. This will position the plug on the ribbon cable near the empty RAM socket. Insert the RAM plug into the socket gently. The cable should bend away from the DSI-A16 card and then back around near the empty socket. The cable should not be twisted. Again, use care in inserting the plug not to bend the pins. If you find it difficult to firmly seat the plug, remove it and realign the pins and try again. You may need to wiggle it slightly but do this very slowly.

▶ INSERT THE EDGE STRIP INTO THE CONNECTOR

Position the card so that the edge strip is centered over the slot 0 edge connector. Set it down into the slot and press firmly. The card should go in with some resistance for about 5mm and stop.

It's a good idea to recheck your work and re-read the instructions to be sure all is correct. When you feel satisfied with the installation replace the cover to your APPLE and you are finished.

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